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Report on convergence of industrial classifications prepared under an agreement between Statistics Canada, the Office of Management and Budget of the United States of America and the Statistical Office of the European Communities

Note by the Secretary-General

In accordance with a request of the Statistical Commission at its thirty-second session,** the Secretary-General has the honour to transmit to the Statistical Commission a report on the convergence of industrial classifications prepared under an agreement between Statistics Canada, the Office of Management and Budget of the United States of America and the Statistical Office of the European Communities.

* E/CN.3/2002/1.

** See *Official Records of the Economic and Social Council, 2001, Supplement No. 4* (E/2001/24), chap. I, sect. A.

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Convergence of industrial classification between NACE and NAICS

Second report of the working group

October 2001

Executive summary

On 14 June 2000, a project to study the potential for greater convergence between the General Industrial Classification of Economic Activities within the European Communities (NACE) and the North American Industry Classification System (NAICS) was initiated under an agreement signed by the heads of the statistical agencies of Canada, the European Union and the United States. The present report outlines a possible scenario for convergence, with associated technical and resource implications.

The working group has developed a "same structure" scenario, with the same 20 major categories at the top of the classification and 379 classes in common, counting classes at all levels of detail, between both classifications. The working group has made no recommendations regarding the adoption of any changes at this time, nor should any aspect of the scenario be construed as a commitment to change by any party.

The scenario presented in the present report represents the best trade-off that can be achieved between cost, in dollar terms and disruption for users, and comparability, according to the opinions of a working group of classification experts. It contains a combination of changes and restructuring that minimizes the impacts on either classification and maximizes comparability between them, while preserving, and in some cases improving an analytically useful framework for industry statistics. At this point, however, the opinions of survey managers, data providers and data users must be sought regarding the costs and benefits of the "same structure" scenario and the other options considered by the working group. The working group believes that the scenario provides a good example of a detailed convergence template for this consultation, and recommends that the next step, assuming that the parties to the agreement wish us to proceed, is to launch a consultation process with stakeholders within our respective jurisdictions.

Introduction

1. On 14 June 2000, a project to study the potential for greater convergence between NACE and NAICS was initiated under an agreement signed by the heads of the statistical agencies of Canada, the European Union and the United States. The agreement outlines a multi-phase approach, beginning with a study of concepts and existing differences in the respective classifications, generation of possible scenarios for convergence, consultation with user communities and finally the recommendation of a template that could be used for convergence. A modular approach is being used during the life of the project. After the completion of each step, a review will be undertaken to decide whether to proceed with the next step. The present report is the second issued under the convergence project.

Benefits of convergence

2. The benefits of convergence are considered by many to be self-evident. However, a brief summary of the potential benefits provides additional context that is vital when considering any future course of action.

3. The comparability of economic statistics across national boundaries is of growing importance in our global economy. For Governments, the ability to observe the impact of a variety of regulatory issues, taxation issues and other policy-based actions on comparably defined groupings of establishments across different countries will provide significant analytical power in support of policy formulation. In the field of international trade, while trade statistics are based on the actual goods or services that cross our borders, comparable data on the units that are making the goods or providing the services are also of significant interest. Most discussions of trade agreements or trade disagreements focus on the impact of an action on domestic industries. The availability of comparable statistics will provide a basis for the assessment of impacts that are made as part of trade negotiations.

4. For business, the ability to compare operating conditions and markets across national boundaries in our global economy is crucial. Statistics produced on the basis of comparably defined groupings of production units will allow businesses to better evaluate a variety of competitiveness factors, such as occupation by industry, industry wage and benefit levels, productivity, inventory levels, order backlogs, capacity utilization, the number of direct competitors, potential customers and suppliers. The greater ability to assess the comparative costs and benefits will have a direct impact on a variety of investment decisions.

5. Comparable statistics on industries will improve the working of credit markets as well. Businesses will have greater access to credit markets and credit providers will be able to more accurately analyse the risk inherent in the provision of credit, particularly to borrowers in other nations. Efficiency enhancements in credit markets increase the efficiency of economies overall.

6. International comparability of industry coding also provides significant benefits to the data-provider community, such as marketing firms, research firms and other compilers of statistics. Those businesses currently try to directly compare prices, employment, skill levels and other variables by industry from a variety of sources, a task made more difficult because of the underlying differences in official government statistics.

Background

7. During the first meetings of the working group, a definition of convergence was discussed. Although the terms of the project referred to convergence, a working definition was not delineated. The convergence working group observed that over the years, continued technical cooperation has improved our understanding of our respective classification systems, which has led to consideration of our differences when independently making changes in NACE or NAICS. Thus, one of the design parameters for NAICS was to strive to ensure that detailed NAICS classes did not cross the boundaries of 2-digit classes in the International Standard Industrial Classification of All Economic Activities (ISIC). Building on current understanding, convergence could be defined on a continuum beginning with changes to NAICS (at the trilateral level) or NACE that would make it easier to reaggregate data compiled under one classification to data complied under the other. Changes to the trilateral level of NAICS may or may not affect detailed national-level industries in Canada, Mexico or the United States. The same situation holds for national versions of NACE. For national variations of both classifications, the mildest form of convergence could involve reaggregation of national details to arrive at comparable groupings. At the other end of the continuum, convergence could mean a fully harmonized structure and nomenclature at the most detailed levels with the same industries, same numbers and identical content.

8. In order to evaluate the range of possible convergence options, the working group first ascertained that there were no fundamental conceptual differences between NACE and NAICS. There was general agreement that adoption of the production function used by NAICS was feasible. In addition, the working group agreed that it was feasible to modify relationships with current product classifications. The North American Product Classification System, currently under development, is a companion to NAICS but does not have a direct industry of origin relationship to NAICS. The Statistical Classification of Products by Activity in the European Economic Community (CPA 1996) does have a direct relationship

with NACE, Revision 1. This relationship would have to be softened. Based on those factors, the range of possibilities was discussed in the first report of the working group (October 2000) and an analysis of the perceived benefits and costs of a variety of options was also included. A brief summary of those discussions will place the balance of the present report in the proper context.

9. In the early 1990s, the parties in this project completed a concordance among the Canadian Standard Industrial Classification (SIC) 1980, the United States SIC 1987 and NACE, Revision 1. The project did provide a better understanding of classifications but did not improve the harmonization of data or lead to a lasting result. The concordance produced was relatively complex and there were numerous "many-to-many" relationships that seriously limited the ability to make precise comparisons of data. The work was extremely valuable and did provide a tool that could be used for comparisons of data, but as noted had considerable shortcomings. The convergence working group acknowledged that and also looked beyond that possibility at convergence options which, through changes to NACE and/or NAICS, would lead to greater comparability by either reducing or eliminating the "many-to-many" relationships or adopting a common structure at a given level. The common structure could involve making changes to NACE and NAICS to adopt a common structure or even keeping the same structure and same numbering system. The changes for reduced or eliminated many-to-many linkages could be done while retaining the autonomy of the individual systems and achieved through reaggregation of classes, in addition to changing the content of some classes to allow better comparisons at any given level. The working group then generated a matrix of possible convergence approaches requiring change to one or both of NACE and NAICS. The matrix covered the analysis of the common structure or reduced many-to-many relationships at the top level, a middle level of 100 classes, a middle level of 300 classes, a hybrid level and the most detailed level.

10. Each of the options was evaluated based on several factors, including the amount of change required (the number of changes required and perceived ability of the working group to resolve the issue), the level of comparability gained, the transparency and ease of use, flexibility in negotiations, tolerance of noise, the level of autonomy available to make either national or regional variations, and finally the ability to maintain any resulting increases in comparability. The initial discussions highlighted the fact that implementation costs would be incurred at varying levels, depending on the path chosen. Significant implementation costs would be incurred by agencies as soon as the content of one lowest-level industry changed. Once surveys are required, the incremental cost for the second or even tenth change is much less than the cost for the first one. Within certain boundaries, multiple changes are not as expensive once the fixed cost for an initial change is required. The cost of changing industry content is significant for all of the parties in the convergence project.

11. To align the highest levels of the classifications, changes in the structure and arrangement of NACE and/or NAICS are necessary. The working group decided that the amount of comparability gained at the highest levels (roughly 20 sectors of NAICS or some combination of those sectors) would be of limited analytical use compared to the cost of recoding units and the disruption to data and time series associated with those changes. For example, the costs of changes required to NAICS and NACE to arrive at a comparable definition of manufacturing were deemed to be greater than the value of having a comparable category as broadly defined as manufacturing, with no additional comparable levels below manufacturing.

12. The working group reviewed mid-level comparability in terms of NACE 3-digit groupings and NAICS 4-digit industry groups. Additional changes beyond those to obtain high-level comparability would be required, and there would be a resulting increase in the amount of disruption to existing data series, offset to some measure by an increase in the amount of comparable data that could be generated. The working group also acknowledged that the degree of change required to both NACE and NAICS would be greatest with a convergence approach that sought to eliminate "many-to-many" relationships at the most detailed level or to apply a common structure at the most detailed level. The detailed level options would provide the greatest comparability of data but at the greatest relative cost to data collectors, data providers, statistical agencies, and public or private data users.

13. The first report concluded that the working group would detail two options on the spectrum of

convergence possibilities: option 1, the adoption by NACE and NAICS of the same structure at the top of the classification down to varying levels of detail across the classification, yielding a common structure of 300 to 400 classes or aggregation levels (hybrid level); and option 2, reduction or elimination of "many-to-many" relationships at the most detailed levels of NACE and NAICS (478 classes that are common to all three NAICS partners). The working group balanced the cost of implementing changes for those options with the improvement in comparability and the ability to maintain comparability in the future when choosing these two options. Option 1 was deemed to be more flexible for the parties. Rather than require strict agreement at a particular level, each area could be evaluated based on the desire for greater comparability. For example, the working group acknowledged that financial systems differ greatly across nations and a higher level agreement would be more appropriate. A similar situation exists for public administration. On the other hand, the working group felt that greater detailed comparability would be desirable for other areas, such as high-technology manufacturing and information.

14. The work is complicated to some extent because of the requirement for NACE to maintain a close relationship with the International Standard Industrial Classification of All Economic Activities of the United Nations. As a result, any potential convergence-related change to NACE could have an impact on ISIC. The United Nations is scheduled to revise ISIC for 2007, but to attempt a convergence study in the current circumstances is like trying to hit a moving target. The project was also constrained because only two of the NAICS partners were signatories to the project. After the initial meeting in Luxembourg in May 2000, Mexico was invited to join the working group and the United Nations Statistics Division was invited to send an observer. In that way, all NAICS partners are part of the process and the United Nations Statistics Division has been kept apprised of the issues and changes that could be provided as inputs for consideration during the scheduled 2007 revision of ISIC.

15. The first step of work under the project required the working group to study and evaluate the similarities and differences between NAICS and NACE. To assist in the analysis of differences and similarities between NAICS and NACE, the working group decided to produce ab initio and to validate a new concordance between the two classifications rather than try to use and reconcile the existing concordance between NACE, Revision 1, Canadian SIC 1980 and the United States SIC 1987. That was a massive undertaking and the result is a comprehensive concordance, fully reviewed and validated by the respective custodians. Even if all other work in the project is suspended, the project will, in that concordance, provide a concrete and valuable deliverable for all concerned. The concordance itself does not change the underlying incompatibilities present in the systems but it does clearly identify our similarities and differences and allows comparison of existing data, albeit imprecise comparison. In addition, the concordance forms the basis for detailing the amount of work necessary to resolve the "many-to-many" relationships at the detailed level. Although technically feasible, resolution of all differences at the most detailed level is not likely.

16. Analyses of differences and similarities between NACE and NAICS were conducted based on that concordance, sector by sector, according to an agreed upon division of labour. The results of those analyses were circulated among working group members and were discussed at the meetings of the working group. At a meeting during November 2000, held in Washington, D.C., participants agreed to the work process and division of labour. At the next meeting, held in February 2001, in Aguascalientes, Mexico, the first batch of analyses was reviewed and preliminary convergence scenarios for the hybrid level option were developed based on those sectors. At the most recent meeting, held in June 2001 in Ottawa, most of the remaining analyses were reviewed and a detailed view of the hybrid level convergence option was developed, which is presented in the present report.

Technical and resource implications of convergence

17. The range of convergence options from the reduction or elimination of "many-to-many" relationships to a completely harmonized nomenclature at the detailed level would require varying levels of resources for successful implementation. Continued technical cooperation requires the lowest level of technical and resource expenditures for periodic meetings to discuss and evaluate classification issues and to share existing and new classification materials and tools, and could result in official concordances of the classifications used by the parties to the agreement.

That level of cost will continue regardless of the outcome of the present project. The reduction or elimination of many-to-many linkages increases costs. At the extreme, the adoption of a fully harmonized system at the detailed level would require significantly greater expenditures and involve data integrity issues. For example, a fully harmonized system would require significant survey activity to properly classify a variety of activities in the new system that are not currently identified at the industry level for both NACE and NAICS. In addition to the resulting time series breaks, there would be costs to recode or renumber business registers, draw new samples based on the redefined industries or classes, generate historical series based on the new structure, recalculate seasonal adjustment factors and carry out similar activities within the statistical systems of the countries. There would also be significant costs for data users and users of the classification that are not part of the statistical system. Third party users, such as mailing list providers, business analysis firms, marketing firms, academics and legislative bodies, would be faced with the costs of updating their products, laws or analysis tools. Overall, those costs would be offset in some measure by the increased ability to directly compare across national and regional lines the industrial structure, output productivity, distribution of occupations by industry and other factors relevant to policy, investment and trade decisions. A problem with costs and benefits is that the benefits will not necessarily accrue to those who bear the cost of implementation. In addition to data integrity costs, the parties to the agreement would lose a certain amount of autonomy to make changes as may prove necessary to meet regional or national classification needs. Because of the relationship between ISIC and NACE, any structural convergence will have to meet an international standard applicable to all nations that has yet to be defined.

18. Although continued technical cooperation leads to a greater understanding of the differences in our various statistics, it does not bring about improvements in the precision of comparison of those statistics. And while there is value in greater understanding, the working group feels that greater comparability is desirable. The fully harmonized system would lead to more comparable data but not fully comparable data because of a variety of technical considerations, such as the application of establishment definitions. Acknowledging that 100 per cent comparability will not be achieved because of such technical considerations as the definition of the establishment, the working group focused on the creation of a scenario that is anticipated to minimize the number of disruptions to existing programmes while obtaining greater comparability and enhancing the relevance of the industry classifications. The resource implications of the scenario are greater than the costs of continued technical cooperation but less than the costs to implement a fully harmonized system at the most detailed levels. The working group also notes that any convergence path should be focused on long-term agreement rather than a point-in-time improvement. It will be hard to justify the costs of change to the existing classifications for convergence if divergence will immediately follow. Changes to the existing systems and a requirement for long-term agreement imply the development of a mechanism to maintain convergence in the future that would involve all of the NAICS partners, as well as the Statistical Office of the European Communities (Eurostat) and possibly the United Nations, depending on the extent of future changes required to classification(s) due to changes in the economies of the signatories. Although that is inherent in the current relationship between NACE and ISIC, a new requirement for agreement by Eurostat or the United Nations would lead to a significant loss of autonomy for NAICS partners. Future negotiations on changes to the classification will become more complex as the number of parties involved increases.

19. Against that background, the working group wishes to present one hybrid-level scenario that represents the results of our analysis and efforts over the past year, as set out below.

The scenario

20. The working group has developed a "same structure" scenario, with the same 20 major categories at the top of the classification and 379 classes in common, counting classes at all levels of detail, between both classifications. Convergence is not pushed down to the same level of detail across the classification, however. In some areas, only the top-level aggregates are the same, while in others there is convergence down to a very detailed level. The end result is a "wavy line" scenario.

21. At this time, the working group does not wish to make any recommendations regarding the coding or numbering system that should be adopted. Whether the converged classes are incorporated into the existing

numbering schemes of both classifications or both classifications adopt a new numbering scheme should be determined after the consultation phase.

22. The scenario implies a few conceptual changes, in particular the adoption by NACE in a pragmatic way of a production process basis for the definition of industry categories and the relaxing of a strict one-to-one relationship between detailed industry classes and classes of the Classification of Products by Activity, the European Union product classification. Although it is not apparent in the structure of the converged classification, the scenario also implies a certain harmonization in the application rules of the classification. For example, the rules regarding vertically integrated operations need to be harmonized. The working group has inventoried those differences and can act upon them if and when a final convergence proposal is developed. In specific terms, the current scenario treats installation and repair and most exceptions to the standard rule for vertical integration according to the NAICS practice.

23. The working group believes that this scenario represents the maximum achievable convergence without introducing truly massive and disruptive changes in either classification. In general, it was produced by moving whole classes, or large identifiable parts of whole classes, into new configurations so as to minimize the amount of detailed recoding of individual records that its implementation would require.

24. The following are the suggested high-level groupings:

Agriculture, forestry, fishing and hunting
Mining
Utilities
Construction
Manufacturing
Wholesale and retail trade
Transportation and storage
Information
Hotels and restaurants
Finance and insurance
Real estate and rental and leasing
Professional, scientific and technical services
Administrative and support services
Education
Health and social services
Arts, entertainment and recreation
Sanitation
Repair and maintenance
Other services
Public administration

25. At this high level of aggregation, there are several important departures from the current structure of both classifications, in particular for NACE. As will often be the case, many of the convergence changes are in fact relevance-enhancing changes that NACE would wish to pursue, with or without convergence, which were adopted earlier in NAICS. Examples include the "Information" and "Professional, scientific and technical services". In the case of "Repair and maintenance", those items were grouped together in NAICS and the working group saw that as a desirable feature for the converged classification. It also provides an alternative solution for NACE class 50, covering the sale and repair of everything automotive, a grouping that was not considered successful by Eurostat. Finally, the scenario implies the adoption by the NAICS countries of a high-level grouping for "Sanitation", an existing NACE grouping. The harmonization of the other high-level groupings can be achieved through a series of more minor changes and moves. The sector descriptions and fully detailed scenarios will be made available to the Commission as background documents.

Work plan and schedule

26. The next phase of the project involves consultation on the variety of paths that could be taken to obtain convergence. Data collectors, data providers and data users should be consulted to determine where on the continuum of convergence possibilities (reaggregation of national level details to full harmonization) they see the best balance of costs and benefits. The scenario presented in the present report represents the best trade-off that can be achieved between cost, in dollar terms and disruption for users, and comparability, according to the opinions of a working group of classification experts. At this point, however, the opinions of survey managers, data providers and data users must be sought regarding the costs and benefits of the "same structure" scenario and the other options considered by the working group. The working group believes that the scenario provides a good example of a detailed convergence template for this consultation, and recommends that the next step, assuming that the parties to the agreement wish us to proceed, is to launch a consultation process with

stakeholders within our respective jurisdictions. One objective would be to enquire what the most useful level of convergence is when taking into account the benefits and costs of each option. Another would be to test the robustness of the scenario to determine whether: (a) data users, data providers and data collectors see the same cost and benefit balance as the working group, and (b) the changes can be feasibly accommodated. The working group could then report in a year's time on how much of the scenario, if any, could be made into a formal convergence template. The results of consultation on the working group scenario and other convergence paths that may be identified and determined to be feasible should result in an accepted definition of convergence and provide greater direction in the development of a formal template for convergence during a later phase of the project. If consultation results in a template requiring changes to the existing classifications, it could form the basis of negotiations between the signatories, the results of which could be fed into the revision process for our respective industry classifications, as appropriate, as well as into the ISIC revision process for 2007. The working group understands that ISIC revision, or lack thereof, will necessarily have an impact on the viability of any template for convergence that requires change to NACE that is in conflict with ISIC.

27. In addition, if a long-term convergence is desired, additional negotiations will be required based on the resulting level of autonomy of NACE and NAICS. If the project is discontinued, the working group should recommend a schedule to formalize the concordance already prepared and a schedule to modify the concordance for future changes in our classifications. If a common structure is proposed, the working group should also recommend maintenance procedures and should agree on how and when future changes to the common structure will be negotiated. If the independence of NAICS and NACE remains (common structure not adopted), plans to maintain agreement should also be recommended that meet the needs of the custodians of the classifications and, to the extent desired, carry forward any increased comparability.